Space Weather Forecast

Issued on Thursday, 13 October 2022 at 13:19 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of Moderate class X-ray flares.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate, with a Moderate flare observed from a moderately sized region in the northwest. This has shown some simplification as it approaches the western limb, losing its easternmost spots. Common class flaring was also observed from a nearby, smaller and magnetically less complex region in the northwest. There are a total of four numbered sunspot regions on the disc, however the other two regions are currently smaller and simpler. There are also a number of filaments (lines of solar material held together above its surface by the Sun's magnetic field) on the Earth-facing disc and these can be a source of coronal mass ejections (CMEs). One of these erupted in the southern centre disc early on the 13th, however the CME that followed has yet to be fully assessed. Given the location of the eruption, any CME is likely to be on the Earth-Sun line, however the majority of the material is likely to head south of the Earth,

Solar Wind / Geomagnetic Activity: The solar wind persisted at background levels, erratically easing from 350 to 300 km/s as Earth remained within the ambient slow wind. The total magnetic field was weak, with the north-south field predominantly in the southward direction (negative) but too weak to result in any notable geomagnetic activity. Geomagnetic activity was Quiet.

Energetic Particles / Solar Radiation: Despite Moderate flaring from the large sunspot on previous days, the count rate of energetic particles (high energy protons) remained at background levels. Consequently no solar radiation storms occurred.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is forecast to be Low to Moderate, with the main risk of Moderate flares from the moderately sized region in the northwest.

Solar Wind / Geomagnetic Activity: There is a CME that is likely to miss Earth day 2 (14th), but has a small chance of giving a peripheral influence as it passes. Otherwise Earth will likely see background winds persisting through much of the period, before the arrival of the fast wind from a small coronal hole later day 2 or more likely day 3 (15th). Geomagnetic activity will be mostly Quiet with a chance of isolated Unsettled (Kp 0-3) intervals, perhaps increasing to Active (Kp 4) with any fast wind or CME arrival.

Energetic Particles / Solar Radiation: The count rate of energetic particles is except to remain at background, but could rise in response to any large flares, mainly from the sunspots in the northwest. This gives a very slight chance of exceeding the S1/Minor Radiation Storm threshold.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	5	10	10
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	30	30	15	10
Very Active	R3 to R5 X	No	2	2	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	2	1
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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